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User's Manual for the Cultural Resources Information System (CRIS)

by

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The Cultural Resources Information System (CRIS) is a computer system developed to support the work of cultural resources managers and environmental planners at U.S. military installations. The system allows managers and planners to input, edit, store, compare, analyze, and output data on historic/prehistoric cultural resources. CRIS is an updated version of the Archaeological Sites Information System (ASIS) that was developed for UNIX computers. CRIS runs on DOS-based microcomputers.

This manual contains instructions for setting up the system, inputting and editing the data, and conducting search/retrieval activities for analysis and reporting.

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User's Manual for the Cultural Resources Information System (CRIS)

1 Background

Researchers in the Environmental Division of the U.S. Army Construction Engineering Research Laboratory (USACERL) have developed computer capabilities to input, edit, store, compare, analyze, and output data on historic/prehistoric cultural resources. These capabilities, which have been organized into the Archaeological Sites Information System (ASIS), were developed to support cultural resource managers and environmental planners at U.S. military installations.

Originally, a system called ASIS was developed on UNIX ¹ computers for use with a geographic information system. ² A newer version of ASIS called the Cultural Resources Information System (CRIS) runs on DOS-based microcomputers such as the IBM PC and compatibles. The UNIX version of ASIS consists of a library of programs written in C programming language. The DOS version of CRIS is compiled with a commercial data base management package, called Quicksilver. ³

CRIS consists of three subsystems: (1) a setup system, (2) a data input/edit system, and (3) a search/retrieval, analysis/report system. In the setup system, you design the form for recording site data by establishing categories (or attributes) that describe the data. Each category creates a labeled 'blank' on the screen 'form.' The number and type of categories varies with each site data set (the DOS version has a limit of 64), but could include such items as site location, number, condition, chronology, function, size, and artifacts.

The data input system allows you to insert data into the 'blanks' of the categories for each site, and the editor is used to review, correct, update, or complete the site data.

¹ UNIX, a trademark of Bell Laboratories, is the name of an operating system which is used on many types of computers.

² This system, called the Geographic Resources Analysis Support System (GRASS), was also developed by researchers within the Environmental Division of USACERL.

³ Quicksilver, trademark of Wordtech Systems.

The search/retrieval system has several search functions. Locational searches, using Universal Transverse Mercator (UTM) or other geographic coordinate values, identify records occurring within a geographic area. Values for numerically recorded site or standing structures can be grouped using a 'range' search (e. g., records with > 1 and < 5 hearths). Boolean 'and', 'or', and 'except' operators can be used to identify any group of records with particular combinations of attributes (for examples, in the sample data base, WESTP, find either Officers' Quarters OR Enlisted Men's Barracks records AND with Ferguson Architect EXCEPT those in zone 4. Or in the demonstration data base, FPOLK, you may conduct a search for Mississippian states, OR Prehistoric Unknown Sites AND with Ceramics.)

As a result of any search operation, CRIS responds with the number of qualifying records. Additional information about these qualifying records can be obtained from several report options. With the 'show report' command, you can request a site report during any phase of a search, and select as many attributes as needed. If desired, these site reports can be saved in a specified file. A second report function compares a list of selected records with any set of attribute classes, such as site types (historic, prehistoric, etc.), site function (cave, rock shelter, midden, petroglyph, etc.), or site condition.

Information and operating instructions for the CRIS Library data bases, BOAS, EXPLORE, FATHOM, HARM, and OLDHAUS are available in separate volumes of this report.

Points of contact for further information about CRIS are Mr. Keith Landreth and Dr. Diane K. Mann. They can be reached at (217) 373-6741 or (outside Illinois) 1-800-USA-CERL, ext. 741 (Mann), ext. 446 (Landreth); (within Illinois) 1-800-252-7122; USACERL, Environmental Division, P.O. Box 4005, Champaign, IL, 61824-4005.

1.1 Installing CRIS

Hardware Requirements. CRIS operates on any IBM or IBM-compatible XT or AT computer using MS-DOS versions 3.0, 3.1, 3.2, or 3.3 as an operating environment. As currently configured, the computer should have a hard drive and 640kb of memory. CRIS will also operate well on laptops with 3-1/4 inch diskette drives. The size of the hard drive is optional and is dependent on the number of categories, the size of a single record, the total number of records in the data base being used, and the size of the projected data base, as well as any additional programs in residence (e. g., word processors, spreadsheets).

CRIS is a compiled program and operates much faster than commercial data base packages. The speed at which CRIS operates on your machine will

depend on several factors including the size of the data base, the CPU, and the hard drive interleave. For small data bases containing 500 to 1000 records, an XT compatible is sufficient. If you are forced to use larger data bases with the XT, CRIS also has a built-in software interrupt (STASH). STASH allows you to interrupt a lengthy search procedure, return to other programs, and resume the interrupted search later.

Like any program, CRIS will run much faster on AT compatible (286) or (386) CPU machines or on any machine with a large RAM drive. In a recent speed test on a standard 6 Mhz AT compatible computer, a 2.6 Mb data base (3300 records), was searched in less than 45 seconds.

System Configuration. Before installing CRIS, you should first check the systems configuration file in the root directory. This is done by typing at the C:> prompt **type config.sys**.^{*} The screen should display a files and buffers statement. Files and buffers should be set at a minimum of 21. If the files and buffers are set at less than 21, change the system configuration files by using the DOS EDLIN line editor, or rewrite the file with the the DOS COPY CON (copy console) command. If you change the file you must also reboot your machine before proceeding.

Installing CRIS on a C Hard Drive With a Color Monitor. To install CRIS, simply place the CRIS diskette(s) in Drive A, type **install** and follow the prompts. If you have a previous version of CRIS installed on your machine, a prompt may appear that install is "Unable to create directory." Ignore this prompt. CRIS will be overwritten onto the existing CRIS directory. The CRIS support files will be copied into the CRIS directory and a new subdirectory CRIS/DATA will be created. The demonstration data bases WESTP (West Point Standing Structures) and FTPOLK (Fort Polk Archaeological Sites) will be installed in this subdirectory. At this point Install will return you to the CRIS directory and you may initiate the program by typing **cris**.

Installing CRIS on Other Hard Drives or Monitors. As shipped, the CRIS program is configured to operate on computers with a hard drive designated "C", and any CGA, or EGA color monitor. If you wish to operate the program on a hard drive with a different designation (e. g., D, E), do not use install. Instead, create two subdirectories on the hard drive designated /CRIS and /CRIS/DATA with the commands, MD CRIS and MD CRIS/DATA.

* Your inputs will be in bold type throughout this report.

You will then need to copy the contents of the diskettes into the CRIS subdirectory and copy the contents of a subdirectory named /DATA on Diskette #2 to the CRIS/DATA subdirectory. The command issued from the CRIS/DATA subdirectory would be: **copy a:/DATA/*.***. After copying the files, return to the CRIS subdirectory, type **CRISINST** and follow the prompts to configure CRIS to your system and monitor.

Backups. In any project involving large data bases, backups are highly recommended to prevent loss of data. The preparation of data for entry and the actual data entry often involve an extreme amount of time and effort. A minimum of two backup copies is recommended. Backups should be made after each input session and stored in a safe place.

2 Definitions of Terms

Before discussing methods of data base design, it is necessary to provide some definitions of terms as used in this manual.

1. Data base. For this system, a data base is a collection of data on a particular subject. For example, if field survey crews collect archeological site data for the entire Fort Polk area, the data collection would be put in a data base named FPOLK. Or certain data on historic structures at West Point would be placed in a data base called WESTP.
2. Record. A record is an entry in a data base. For example, the data from one structure in the WESTP data base or one site in the FPOLK data base would be placed in a single record. A unique number is sequentially assigned to each record automatically.
3. Category (also known as Field). This is a subdivision of a record. Each category represents a particular characteristic of the subject of the data record. For example, one of the categories in the sample data base WESTP, is ARCHITECT. This category contains the name(s) of the Architect(s) who designed the structure. Each category must be designated as either (C)haracter, (N)umeric, or (D)ate type. If a particular category is Numeric, only numbers may be entered in that category. Character categories may use letters, numbers, or a combination thereof. Date type categories are used to record date values in the mm/dd/yy format. A list of all the categories, their types, maximum width, and number of decimal places (if the category is numeric) is known as the data structure.
4. Value. Value refers to the contents of a category. Each category is assigned one or more values (if data is available) for each record. For example, the name of the architect who designed a structure in the WESTP data base would constitute a value. Or on an archaeological site with a prehistoric component in the data base FPOLK, the designation, MI (Mississippian) would constitute a value.

The sum of all the category values for a particular data base entry comprises the record. As the number of categories in a data base expand, the size of a record also expands. The sum of all the records comprises the data base. CRIS accommodates a maximum of 64 categories and approximately 1 billion records. Available hardware, disk space, and response time on data searches and tabulations provide more practical restrictions, however. The response time of the computer is lengthened as both the number of categories and records increase.

2.1 Data Categories

Two sample data bases called WESTP and FPOLK are provided on the diskette with the CRIS programs. Tables 2.1-A and -B show the data structure for WESTP and FPOLK. The data for WESTP was derived from the West Point Military Academy Historic Building Inventory, and the data for FPOLK was derived from an archaeological inventory at Fort Polk, Louisiana. Categories are titled customized to the entry of this data. The kind and number of data categories will vary. You may use CRIS to record available data in a few basic categories or you may include categories for descriptions of subjects to permit analysis and interpretation. Regardless of the number and sophistication of the categories designed, the basic approach is the same. Practical constraints to be considered are:

- (1) pattern of the values entered (set pattern, like state site numbers, varied patterns, like general comments on a structure or archaeological site);
- (2) uniqueness of a category's values (different number for each structure);
- (3) potential goals of a search of the values in a category;
- (4) usefulness of information in a category for a computer search; and interrelationships between categories;
- (5) range or scale of numeric values for useful searches (all measurements in a category in centimeters, for example).

2.2 Data Class Values

Every data category in CRIS can be searched. That is, the data record can be retrieved from the data base in the Search and Retrieval program through one of several search strategies. To maximize the utility of the search and retrieval function, the data should be organized in a manner that will illuminate the relationships between categories.

For some data categories, such as BUILDNO (Building Number), or SITENO (Site Number), the value for each structure is unique, but follows an assigned sequence. In these cases, there is a search, with which, for example, structures 10 through 50 could be located in the data base and retrieved. For WESTP and FPOLK data, those categories for which the range search applies are identified in Tables 2.2-A and B.

Table 2.1-A

Data Structure for WESTP			
Category	Type	Width	Decimal
BUILDNO	N	4	0
OTDESIG	C	30	0
BUILDNAME	C	30	0
DATEBUILT	N	4	0
ARCHITECT	C	40	0
ORIGUSE	C	30	0
ZONE	N	1	0
BLDG	N	1	0
COMMENTS	C	80	0
LOCATION	C	30	0

Table 2.1-B

Data Structure for FPOLK			
Category	Type	Width	Decimal
SITENO	C	12	0
OTDESIG	C	30	0
PARISH	C	2	0
ZONE	N	2	0
NORTHING	N	7	0
EASTING	N	6	0
CULTAFFL	C	16	0
REMARKS	C	55	0

Table 2.2-A

Examples of Structure Considerations for WESTP Data		
Category Title	Content	Search Potential
OTDESIG	Other Designations	Class - all records
	assigned by West Point	with a certain
	archaeologist(s)	designation
BUILDNAME	Building Name	Class - building with certain
	Width of category will	names (e. g., Garage,
	vary data	Officers Quarters)
DATEBUILT	Year of Original	Range - buildings
	construction.	constructed between certain
	Width of 4 numbers	years
ARCHITECT	Architect name(s).	Class - buildings with certain
	Multiple names possible for	architects
	each record	
ORIGUSE	Original Use of building	Class - buildings with certain
		original uses
ZONE	Zone Number	Range or Locational - buildings
	Only 1 number per record	located in certain zones
BUILDNO	Building Number assigned by	Limited to finding
	West Point archaeologist(s).	individual records
	Only 1 number per record	
COMMENTS	Additional Comments made	Limited to reading
	under individual entries	info on individual records
LOCATION	Building Location	Locational - buildings in
		certain locations

Table 2.2-B

Examples of Structure Considerations for FPOLK Data		
Category Title	Content	Search Potential
SITENO	State Site number	Class
OTHDESIG	Other Sites Names; Designations	Class - all records with a certain designation
PARISH	Parish; Geographical Unit within state	Range - or locational; sites located between certain parishes
ZONE	UTM Zone	Range - or locational Sites within UTM Zone
NORTHING	UTM North Coordinate	Range / Locational UTM Search
EASTING	UTM East Coordinate	Range / Locational UTM Search
CULTAFFL	Cultural Affiliation (e. g., Mississippian, Caddo)	Class - sites with certain cultural components
REMARKS	Additional Comments made under individual entries	Limited to reading info on individual records

Some categories provide locational information, such as the UTM grid coordinates in the "Easting" and "Northing" categories. For these categories, there is a UTM search that allows you to define a rectangular area of interest. The Search and Retrieval program will find and retrieve all sites occurring in this area. A sample UTM search routine for FPOLK is provided in Section 9.

For many categories, the record values fall into predetermined classes, such as the names of architects in the category, ARCHITECT, in WESTP data base or CULTAFFL (Cultural Affiliation) in FPOLK. Examples of class values for WESTP and FPOLK categories are listed in Tables 2.3-A and B.

Table 2.3-A

Examples of Selected Class Values for WESTP Data Categories			
Building Name	Date Built	Zone	Location
FHCGWO	1929	1	West Point
FHCIV	1870	2	West Point
FHLCMAJ	1870	2	West Point
FHCIV	1870	2	West Point
FHLCMAJ	1892	2	West Point
FHCGWO	1870	2	West Point
FHCGWO	1870	2	West Point
FHCOL	1901	2	West Point
DG	1937	2	West Point
FHCOL	1901	2	West Point
DG	1937	2	West Point
FHCOL	1901	2	West Point
DG	1941	2	West Point
FHCOL	1901	2	West Point
DG	1937	2	West Point
FHCOL	1901	2	West Point

Table 2.3-B

Examples of Selected Class Values for FPOLK Data Categories		
CULTAFFL(Cultural Affiliation)	PARISH	ZONE
MI (Mississippian)	VN (Vernon)	15
PU (Prehistoric Unknown)	VN (Vernon)	15
CAD (Caddoan)	VN (Vernon)	15
ANTE (Historic Antebellum)	VN (Vernon)	15
HM (Historic Unknown)	VN (Vernon)	15

3 Using CRIS (Main Menu and Explanations)

CRIS is accessed by simply typing **cris**. Once this is done, the following list of options will appear on the screen:

MAIN MENU

Selected Data Base:

Options:

- 0)....Quit
- 1)....List Directory of Existing Data Bases
- 2)....Select Data Base or Create New Data Base
- 3)....Display Data Structure
- 4)....Modify Data Structure
- 5)....Input New Data or Edit Existing Data
- 6)....Input New Codes or Edit Existing Codes
- 7)....Search and Retrieve Data
- H)....Help (Brief Explanation of These Options)

Enter Option number:

Option 0. The QUIT option exits the CRIS System and returns to DOS.

Option 1. List Directory of Existing Data Bases simply contains a listing of the current data bases in CRIS. It also contains each data base file name, its size, and number of bytes.

Option 2. Select Data Base or Create New Data Base offers the opportunity to pick the data base you wish to add data to or interrogate, or to create a whole new data base. Only one data base can be operated on at a time. The name of the selected data base is centered near the upper portion of the screen. For this option, you may choose either WESTP or FPOLK for the demonstration data bases.

Option 3. Display Data Structure shows the name, type, width, and decimal places of each category in the data base.

Option 4. Modify Data Structure allows you to alter the number, type, and width of categories in the existing data base. This option is also used to create a new data base structure.

Option 5. Input New Data or Edit Existing Data is designed to provide you with a relatively easy method to add data. If selected, this program creates an input form on the screen, and the you simply fill in the blank form with the option of having repetitive data carried over from one form to the next.

This option is also used to edit existing data records. The editor first asks:

What record do you wish to edit?:

When an existing record is selected (by record number) the record form is drawn on the screen with all of the known data filled out on the form. If new information is known, or if old information needs correcting, you simply type onto the form, overwriting the current form.

Option 6. Input New Codes or Edit Existing Codes allows you to enter (and/or modify) the codes and descriptions used in the values of the categories of CRIS. A code word is often shorter than the actual description. For example, FHCOL is a code, Family Housing Colonel is its description (see Table 2.3-A); or MI is a code, Mississippian Site is its description (see Table 2.3-B).

Option 7. Search and Retrieve Data allows you to search the existing data by geographic location, category values, and numeric identifiers. This program also provides several options for reporting selected data from the data records. This is the central function of CRIS; providing a means to search, sort, and list all or part of the known data records.

Option H. Help gives you a brief explanation of all these options. After choosing the number of the option, press any key to return to the Main Menu.

3.1 Seeing the Directory of Current Data Bases

After CRIS is accessed by typing **cris**, the main menu appears on the screen.

MAIN MENU

Selected Data Base:

Options:

- 0)....Quit
- 1)....List Directory of Existing Data Bases
- 2)....Select Data Base or Create New Data Base
- 3)....Display Data Structure
- 4)....Modify Data Structure
- 5)....Input New Data or Edit Existing Data
- 6)....Input New Codes or Edit Existing Codes
- 7)....Search and Retrieve Data
- H)....Help (Brief Explanation of These Options)

Enter Option Number:

Type **1** and the current directory of data bases will be brought up on the screen.

CULTURAL RESOURCES INFORMATION SYSTEM

Data base Files	# Records	Last Update	Size
WESTP.DBF	50	04/27/88	13312
FPOLK.DBF	50	07/29/88	6970

20,282 bytes in 2 files.
7919616 bytes remaining on drive.

Press Any Key to Continue

After you have pressed any key, the Main Menu will return.

4 Setting Up a Data Base

After CRIS is accessed by typing **cris**, the main menu appears on the screen.

MAIN MENU

Selected Data Base:

Options:

- 0)....Quit
- 1)....List Directory of Existing Data Bases
- 2)....Select Data Base or Create New Data Base
- 3)....Display Data Structure
- 4)....Modify Data Structure
- 5)....Input New Data or Edit Existing Data
- 6)....Input New Codes or Edit Existing Codes
- 7)....Search and Retrieve Data
- H)....Help (Brief Explanation of These Options)

Enter Option Number:

Type 2 and the following screen will appear:

DATA BASE SELECTION

CURRENTLY SELECTED DATA BASE: WESTP

Enter Name of Data Base : NEWONE

To Create a New Data Base, Enter the New Data Base Name

In this case, the title 'NEWONE' has been typed. You type the title after the colon. The next screen will query if the data base is new.

DATA BASE SELECTION

Enter Name of Data Base : NEWONE

Data Base Does Not Exist. Do You Wish to Create It (Y or N):

You would type **Y** to begin setting up a data base.

4.1 Creating a Category

After you type **Y** to create a data base, a screen is brought up to create the first category.

DATA BASE SELECTION

Category Number : 1

Category Name

Type of Category

Length of Category

Decimal Places

If, for example, you wish category 1 to be the state record number, the word **NUMBER** might be typed in after the Category Name. Because the state record number is normally a combination of both numbers and characters, a **C** for characters would be typed after Type of Category. Length of Category would probably be eight for a record number and an **8** would be typed. Decimal Places would have **0** typed after it because no decimal places are used with characters. The screen would appear like this after typing was completed.

DATA BASE SELECTION

Category Number : 1

Category Name NUMBER

Type of Category C

Length of Category 8

Decimal Places 0

Are You Satisfied with this Entry? (Y or N):

 If you notice an error and type **N** the screen will be brought back for correction. If you are satisfied and type **Y** the category information is maintained and the next screen includes a query.

DATA BASE SELECTION

Category Number : 1

Category Name NUMBER

Type of Category C

Length of Category 8

Decimal Places 0

Do You Wish to ADD MORE Categories ? (Y or N):

4.2 Additional Categories

Typing **Y** brings up a screen for creating another category and the procedure in 4.1 is repeated, but the heading will be Category Number 2. When completed, the screen for Category Number 2 might look like this for a category containing site size information:

```
-----  
                        DATA BASE SELECTION  
-----  
                        Category Number :   2  
  
Category Name      SIZE  
  
Type of Category   N  
  
Length of Category 15  
  
Decimal Places     1  
  
Do You Wish to ADD MORE Categories ? (Y or N):  
-----
```

When you are finished setting up categories during a session, type an **N** in reply to the query and the operation for setting up categories will end.

5 Modifying Data Structure

Categories that have been created can be modified and new categories can be added to a data base until the limit of 64 is reached. This is accomplished by selecting Option 4 of the Main Menu.

MAIN MENU

Selected Data Base:

Options:

- 0)....Quit
- 1)....List Directory of Existing Data Bases
- 2)....Select Data Base or Create New Data Base
- 3)....Display Data Structure
- 4)....Modify Data Structure
- 5)....Input New Data or Edit Existing Data
- 6)....Input New Codes or Edit Existing Codes
- 7)....Search and Retrieve Data
- H)....Help (Brief Explanation of These Options)

Enter Option Number: 4

5.1 Adding New Categories

Typing 4 after Enter Option Number: brings up a screen that gives you the add/modify capability.

MODIFY DATA STRUCTURE

Selected Data Base: NEWONE

This Function Sets Up Category Definitions.

Do You Wish to (A)dd New Categories, (M)odify Existing Categories or (Q)uit:

If you type **A** for adding categories and, for example, 25 categories exist in the NEWONE data base, the screen brought up will be the familiar category screen, but labeled Category Number 26 and the procedures described in paragraphs 4.1 and 4.2 are repeated.

MODIFY DATA STRUCTURE

Category Number: 26

Category Name

Type of Category

Length of Category

Decimal Places

5.2 Modifying Existing Categories

Type **M** to modify an existing category. The next screen requests the name of the category to be altered.

MODIFY DATA STRUCTURE

Enter Name of Category You Wish to Change:

For example, if you decided to change category 1 of NEWONE entitled **NUMBER**, then **NUMBER** would be typed after the colon and that category would be brought to the screen. After modifying the category, a prompt that asks whether you are satisfied with the changes will appear.

MODIFY DATA STRUCTURE

Category Number : 1

Category Name NUMBER

Type of Category C

Length of Category 8

Decimal Places 0

Are You Satisfied with this Entry ? (Y or N):

If you answer by typing **Y**, all changes are made. If you type **N**, the screen of Category Number 1 is brought up again to be altered.

The following cautions should be observed when modifying a structure:

A Category Name may be changed without losing data previously in records.

If the Type of Category is changed from **C** (character) to **N** (number), all the previous nonnumeric data entered in the records for that category will be erased. Data in numeric form would have to be entered for this category in each record. However, numeric data will not be lost if Category of Type **N** (number) is changed to **C** (character) because Type **C** (character) accommodates both numbers and characters.

If the Category Length is extended, the data will remain the same. Usually, the length is increased to provide more space for input. If the length is decreased, character data entries longer than the modified length would have letters truncated. Similarly, numeric data entries that were longer than a modified category length would lose decimal places.

A change in Decimal Places would not erase data entries; however, you may lose data: Previously entered data would have places dropped with a decrease in Decimal Places; and 0's (zero's) would be added with an increase.

After a category is modified, you are queried about changing other categories. The process may be repeated by typing Y.

5.3 *Displaying Data Structure*

Once categories have been created for a data base, you may elect to display these categories (the data structure) by typing 3 when in the Main Menu.

MAIN MENU

Selected Data Base:

Options:

- 0)....Quit
- 1)....List Directory of Existing Data Bases
- 2)....Select Data Base or Create New Data Base
- 3)....Display Data Structure
- 4)....Modify Data Structure
- 5)....Input New Data or Edit Existing Data
- 6)....Input New Codes or Edit Existing Codes
- 7)....Search and Retrieve Data
- H)....Help (Brief Explanation of These Options)

Enter Option Number : 3

Table 2.1-A is the Display Data Structure for the data base WESTP. The 10 categories are listed with their type, width, and decimal places. Option 3 displays data structure in this composite columnar form.

6 Data Input

Data for additional records may be added to the data base by selecting Option 5 on the CRIS Main Menu. After typing a 5 you are asked whether you wish to add or modify site data. Type an A to add new site data. CRIS will also ask if you want to have these values carried forward. Type a Y and the screen then clears and a layout appears on the screen. The layout consists of the record number at the top, which is automatically assigned by the system, and all data category names. Each category name is followed by an inverse video bar. The length of each bar constitutes the maximum defined length of a value for that particular category.

6.1 *Input of Data.*

You input new site data by simply typing values for each category within the inverse video bar. The Enter key advances the cursor to the next category. The system will accept no data beyond the length of the video bar. Only numbers may be entered as values for Numeric fields. The system will accept virtually any character or number for any Character field.

NOTE: Multiple category values MUST be separated by a semicolon with no spaces before or after the semicolon. The system will treat it as a delimiter between two separate category values. For example, a category for materials might contain several values (e. g., bone; ceramic; glass) or a category, CULTAFFL (Cultural Affiliation), might contain several values such as MI;CAD;ANTE for a site with Mississippian, Cad-doan, and Historic Antebellum components.

6.2 *Cursor Movement*

Pressing the < Space> bar will overwrite existing values with blanks. Nondestructive movement within a category value may be accomplished by using the left and right arrows on the keyboard. The up-arrow moves the cursor up one category; the down-arrow moves the cursor down one category.

6.3 Finishing Up

When you input data for the last category on the screen, a prompt will appear at the bottom of the screen:

Are You Satisfied with this Entry? (Y or N):

If you respond with an **N**, the cursor returns to the first category on the screen. If you type **Y**, another prompt will appear:

Do You Wish to ADD More Data? (Y or N):

Pressing **N** will terminate the input session. Pressing **Y** will add another blank data record and prepare the screen for data input.

6.4 Multiple Pages of Data

One input screen holds 14 categories. If more than 14 categories exist, the system will bring up successive screens after you answer that you are satisfied with the current entry.

6.5 Changing Site Data After it is Written to Disk.

You can change site data by terminating the input session (described above), choosing Option 5 on the CRIS Main Menu, and pressing **M** when asked if you wish to add or modify data. More about this is described in the next chapter.

7 Data Editing

Existing Data may be modified by choosing Option 5 on the Main Menu. After you type a 5, CRIS will respond with the following query:

This Function Adds New Data and/or Modifies Existing Data.

Do You Wish to (A)dd New Data, (M)odify Existing Data, or (Q)uit :

Type in an **M**. Next the screen clears and you are prompted to enter the number of the record to be edited. The system will then try to locate the desired record. If the system cannot find the requested record number, a message to that effect will appear at the bottom of the screen. Then CRIS gives you another chance to enter a new number.

When the system finds the record number, the screen clears again and the category layout appears. The layout consists of the record number at the top, which cannot be changed, and all category names. Each category name is followed by values within inverse video bars.

Record Number: 1 page 1
Selected Data Base: WESTP

BUILDNO	:	0
OTDESIG	:	
BUILDNAME	:	FHCGWO
DATEBUILT	:	1929
ARCHITECT	:	CRAM,FERGUSON
ORIGUSE	:	OQ
ZONE	:	1
BLDG	:	3
COMMENTS	:	
LOCATION	:	WEST POINT

(E)dit, (F)orward, (B)ackward, (A)nother Record, (D)elele Record,
(Q)uit :

Pressing an **E** will begin the process for editing the data in this record. Pressing an **F** will allow CRIS to go to the next (following) numbered record. Pressing a **B** will cause CRIS to go to the preceding numbered record. Pressing an **A** will let you choose any other record. Pressing a **D** will begin the short process for deleting the current record shown. Pressing a **Q** will bring the Main Menu back.

7.1 Editing the Data

Press an **E** and the new prompt at the bottom will be:

Do You Wish to Use the On-Line Code Information (Y or N) :

Pressing an **N** will put the cursor at the first value, ready to be edited. Pressing a **Y** will cause a "Help Window" to appear at the bottom half of the screen.

The first two categories in the WESTP data base do not have any code words; therefore, you will see this message in the window for the BUILDNO and OTDESIG categories:

There aren't any codes for BUILDNO. (and again for OTDESIG)

Press any key to continue.

Press any key and the cursor will go to the next value, ready to be edited. If no changes are required in the shown value, press the return key and the cursor will return to the window phase. If CRIS has no codes for the next category, the above window will appear and you must press any key to cause CRIS to get the cursor to the value, ready to be edited.

Again, if no changes are required in the value, press the return key and the cursor will go back to the window phase.

For the category, BUILDNAME, the screen will look like this:

Record Number: 1 page 1
Selected Data Base: WESTP

BUILDNO : 0
OTDESIG :
BUILDNAME : FHCGWO

FHCGWO	Family Housing Company Grade Warrant Officer
FHCIV	Family Housing Civilian
FHCOL	Family Housing Colonel
FHDIA	Family Housing DIA
FHGEN	Family Housing General
FHLCMAJ	Family Housing Lieutenant Colonel/Major
FHNCO	Family Housing Non-Commissioned Officer

Press 'Q' to Quit, 'B' to Go Back, Any Other Key to Continue :

Pressing the **Q** quits the window and puts the cursor at the value, ready to be edited. Pressing the **B** causes CRIS to go back one-half screen on the window. Pressing any other key will cause CRIS to go ahead one-half screen on the window.

You edit record data by simply typing over values for each category. Cursor movements are invoked in the same manner as described in the previous section. Pressing the < Space> bar will overwrite existing values with blanks. Nondestructive movement within a category value may be accomplished by using the left and right arrows on the keyboard. The up arrow moves the cursor up one category; the down arrow moves the cursor down one category.

7.2 *Finishing Up*

When you edit data for the last category on the screen, a prompt will appear at the bottom of the screen :

Are You Satisfied with the Entry? (Y or N):

If you respond with an N, the cursor returns to the first category on the screen. If you type Y, the following prompt will appear:

(E)dit, (F)orward, (B)ack, (A)nother Record, (D)elele Record, (Q)uit :

At this point you have the option to repeat the process, continue scrolling through the data base with B, F or A, or quit (Q).

8 Inputting New Codes or Editing Existing Codes

Codes and definitions that have been entered can be modified, and new codes and definitions can be added to a category of a data base.

8.1 Adding New Codes / Definitions

To choose this option, type 6 from the Main Menu Screen,

MAIN MENU

Selected Data Base: WESTP

Options:

- 0).... Quit
- 1).... List Directory of Existing Data Bases
- 2).... Select Data Base or Create New Data Base
- 3).... Display Data Structure
- 4).... Modify Data Structure
- 5).... Input New Data or Edit Existing Data
- 6).... Input New Codes or Edit Existing Codes
- 7).... Search and Retrieve Data
- H).... (Brief Explanation of These Options)

Enter Option Number:

and the next screen will appear.

SET UP CODE DEFINITIONS

Do you wish to A(dd) new codes, M(odify) existing codes or Q(uit):

Pressing a **Q** bring ups the Main Menu screen again. Typing an **A** causes CRIS to ask which category you wish to work on, giving you the list of the categories:

Enter name of category: BUILDNAME

BUILDNO	OTDESIG	BUILDNAME	DATEBUILT	ARCHITECT
ZONE	BLDG	COMMENTS	LOCATION	

In this case, the category BUILDNAME, has been chosen. Now the work screen will appear:

SET UP CODE DEFINITIONS

Category: BUILDNAME

Code:
Description:

After typing in a code, enter it by pressing the enter key. The cursor will be moved to the description line. After typing in the description, press the enter key again and the following screen will appear with the new prompt at the bottom:

SET UP CODE DEFINITIONS

Category: BUILDNAME

Code: FHCOL
Description: Family Housing Colonel

Are you satisfied with this entry? (Y or N):

In this case, the Code was FHCOL and the Description phrase was Family Housing Colonel. It is suggested that you use all capital letters for the codes and mixed capital and lower case letters for the descriptive phrases. Typing an N will allow you to go back to the Code/Description prompts. Typing a Y will query if you want to add more codes/descriptions. (Just remember what category you are in.)

Do you wish to ADD MORE codes? (Y or N):

Typing a Y will allow you to enter a new code at the Code/Description prompts. Typing an N will simply bring back the Main Menu Screen again.

8.2 Modifying Existing Codes/Descriptions

After selecting number 6 from the Main Menu, you will see this screen:

SET UP CODE DEFINITIONS

Do you wish to A(dd) new codes, M(odify) existing codes or Q(uit):

Typing an M will cause another screen to appear, which asks you what category, giving a list of categories.

SET UP CODE DEFINITIONS

Enter Name of Category:

Code: FHCOL
Description: Family Housing Colonel

If you entered the category, BUILDNAME, for example, the next prompt at the bottom of the screen will be:

(E)dit, (F)orward, (B)ack, (A)nother Code, (D)elete, (Q)uit this Category :

Pressing an **E** will begin the process for editing the code and definition. Pressing an **F** will cause CRIS to go forward one code word and definition. Pressing the **B** will cause CRIS to go backward one code word and definition. Pressing an **A** will allow you to select any other code word and definition by giving the "pop-up window" screen, and then prompting with "Enter the Code:" (If the code you entered cannot be found, CRIS will automatically report the error at the bottom of the screen, and give you a second or third chance to type in and enter the desired code.) Pressing a **D** will begin the process for deleting the code and definition. Pressing the **Q** will cause CRIS to go back to the Category prompt.

Type in an **E** to change the code and/or description by simply retyping over the codes and/or descriptions to modify them. Press the Enter key to save your touchups.

After you enter the description word, the screen with the prompt at the bottom will be:

SET UP CODE DEFINITIONS

Category: BUILDNAME

Code: FHCOL
Description: Family Housing Colonel

(E)dit, (F)orward, (B)ack, (A)nother Code, (D)elete, (Q)uit this Category :

The process can then be repeated.

9 Search and Retrieval Program

When you select Option 7 from the Main Menu, the following new menu appears:

DATA SEARCH & RETRIEVAL

Selected Data Base: WESTP
0 Record(s) Currently Selected
Options:

- | | |
|--|-------------------------------|
| 0. Quit | 5. Display Category Values |
| 1. Begin a New Search | 6. Display Value Tabulation |
| 2. Continue a Search | 7. Display Search History |
| 3. Column Report | 8. View/Edit Selected Records |
| 4. Display Data Structure | 9. Print Selected Records |
| C. Copy Selected Records
to New Data Base | |
| S. Stash | |
| R. Restore | |
| H. Help | |

Enter Option Number:

9.1 Searching the Data

The fundamental use of the search and retrieval program involves selecting cultural resource records based on desired values, and producing output from the results of these selections. CRIS uses a combination of boolean operators and operator symbols to select desired records. The selection process is called a search. You have the option to either begin a new search (Option 1) or continue a search. When Option 1 is selected, all effects of previous searches are erased. To operate the search options of CRIS, you must first have a basic understanding of boolean operators and the operator symbols. Operator symbols will be discussed first.

9.2 Operator Symbols (= , < > , > , < , \$)

Operator symbols are used to "compare" the search value that you input with the actual values in the specified data base category.

The equal sign (=) is used in exactly the same manner as in mathematics. It is used primarily on numeric values. Simply put, it tells CRIS to select records where the actual category value exactly matches the "test" value.

The not equal symbol (< >) is the opposite of the equal sign. It tells CRIS to select those records that do not match the test value. It is used on numeric values.

The greater than symbol (>) is used on numeric values. It tells CRIS to select those records that have a category value that is numerically higher than the test value.

The less than symbol (<) is also used on numeric values. It tells CRIS to select those records that have a category value numerically lower than the test value.

The dollar sign (\$) is used to perform a "string" search. It compares the test value with any portion of the actual category value. For example, test values of "stones", "rock", and/or "one" will pull up the actual category value of "rocks and stones". The word one is included in the word stONEs. String searches are quite useful when multiple values exist in a single category. String searches are only allowed on character values.

9.3 Boolean Search Commands ('and', 'or', 'except')

The boolean operator, 'and', constricts a search. It selects from previously selected records those that have the specified value in the specified category.

The boolean operator 'or' expands a search. It adds to those records already selected all other records with the specified category value.

The 'except' boolean operator constricts a search by excluding records that have the value in the specified category from the previously selected records.

Example: If **1** (Begin a Search) is typed using WESTP data and the following entries are made,

Category	ARCHITECT
Operator	\$
Value	FERG
Boolean	< Return> key

nine records will be selected because each of them had a string (\$) search that matched FERGUSON (the architect).

9.4 Continuing a Search

The above search can be continued by typing a **2** (Continue a Search) which brings up the Boolean options. If the following request using **or** as the Boolean is typed,

Boolean	OR
Category	LOCATION
Operator	\$
Value	WEST

the total number of records selected would expand to 50 because these 50 records would either have the architect, FERG, in the ARCHITECT category, or the word, WEST (for West Point), in the LOCATION category, or both.

9.5 Displaying A Column Report

If **3** (Column Report) is typed, the following screen is brought up. To display the results of the search from the Architect and Location categories, **ARCHITECT** is typed in first, entered, then **LOCATION** is typed in second and entered.

DISPLAY SEARCH RESULTS

Selected Data Base: WESTP

Please Enter Names of the Categories that You Want to Appear on the Report.

Enter Category Name:

(You May Select Up To 9 Categories; Leave Blank to Stop.)

BUILDNO	OTDESIG	BUILDNAME	DATEBUILT	ARCHITECT	ORIGUSE
ZONE	BLDG	COMMENTS	LOCATION		

After you type and enter one category, it will be highlighted on the screen. If more categories are typed and entered one by one, they will also be highlighted. To stop the listing, simply press the return key.

The cursor is moved to the bottom of the screen and the title of report is requested. After a title is typed, a query is made about whether to have the report seen either on the screen or sent to the printer. If you type an **S**, the report will be shown only on the screen; typing **P** will send the report to the printer.

9.6 Searching UTM Coordinates

Geographic Searches may be performed by typing **UTM** in response to the Category prompt. If you are beginning a search, press the < Return> key in response to the Operator, Value, and Boolean prompt. If continuing a search, enter the desired boolean operator at the Boolean prompt, **UTM** at the Category prompt, and < Return> key at the Value prompt.

You are prompted to enter four values: an upper northing value, a lower northing value, an upper easting value, and a lower easting value. The system then selects all records within those boundary values.

NOTE: A minimum of two U.T.M. categories must be defined as numeric with the names, **EASTING** and **NORTHING**, in order to perform a geographic search.

Geographic Search

UPPER NORTHING VALUE
3438000

LOWER
EASTING VALUE
485000

UPPER
EASTING VALUE
487000

LOWER NORTHING VALUE
3436000

The West Point Data Base does not contain UTM data. Another sample data base, FPOLK, does have Easting and Northing UTM Coordinates. To perform a sample UTM Search, return to the CRIS Main Menu, and select the FPOLK data base with option 2. Return to the Retrieval Menu (Option 7) and select a UTM Search. Input the values listed under the Geographic Search on the preceding page. CRIS will select 10 sites.

9.7 Displaying Data Structure

Option 4 is exactly the same as Option 3 on the Main Menu of CRIS. It displays the name, type, width, and decimal places of each category in the data base on the screen. It allows you to quickly access the name and type of each category when performing searches.

9.8 Displaying Category Values

Option 5 lists all values in a particular category to the screen. Type in the name of a category such as **ARCHITECT** or **CULTAFFL** and all the values are displayed for that category for the currently selected records of a search.

9.9 Value Tabulations

Option 6 performs a tabulation on value occurrences in a category that you choose. Tabulations are useful for performing frequency distributions and cross-tabulations on multiple categories. They may also be used to check on the consistency of data that has recently been inputted.

Output of the tabulation report is formatted in 5 columns:

- Column 1 contains the actual values in the selected category.
- Column 2 lists the total number of occurrences of each category value among records in the entire data base.
- Column 3 lists the occurrence of each category value among records selected from previous searches.
- Column 4 gives the percentage that selected value occurrence represents on the occurrence of that particular category value in the entire data base.
- Column 5 lists the percentage that selected value occurrence represents on all the values that have been selected.

Tabulations are performed on values. If delimiters (;) are used, more than one value may exist within the same category in one record. Column 5 takes the number in column 3 and divides it by the total number of value occurrences that have been selected (total of column 3). Column 4 takes the same number in column 3 and divides it by the number of occurrences for that value in column 2. The total number of value occurrences in the category is calculated by adding all numbers in column 2.

Besides obtaining frequency distributions on value occurrences within a category, the tabulation function may be used to do cross-tabulations. This is done by first selecting a group of records through one or more searches and then using Option 6.

For example, suppose you are interested in current uses of structures originally constructed as officers' quarters (OQ). This could be accomplished by beginning a search (Option 1) of the category ORIGUSE (Original Use). The screen would appear as follows:

Category	ORIGUSE
Operator	\$
Value	OQ
Boolean	

Thirty-one records would be selected. A tabulation of the values in the category, BUILDNAME (Building Name), could be obtained (Option 6) by typing BUILDNAME at the category prompt, pressing enter, completing the title prompt, and pressing enter again. The second column of numbers would show the changes from original use as OQs. The fourth column gives the percentage of selected records with these conditions. (See Table 9.1)

Table 9.1

Value Tabulations for WestP				
VALUES FOR : BUILDNAME	TOTAL NO. VALUES IN DATA BASE	NO. VALUES SELECT.	% VALUES IN DATA BASE	% TOTAL VALUES SELECT.
CHAPQ	1	0	0.0%	0.0%
DG	17	0	0.0%	0.0%
FHCGWO	4	4	100.0%	12.9%
FHCIV	3	3	100.0%	9.7%
FHCOL	22	22	100.0%	71.0%
FHDIA	1	0	0.0%	0.0%
FHLCMAJ	2	2	100.0	6.5%
TOTALS	50	31		100.0% *

31 Value(s) Selected From a Total of 50 in Data Base.

The output of this option may be directed to a printer.

9.10 Displaying Search History

Option 7 displays the results from each search performed since beginning the search. This function is useful for keeping track of an extended search. If this operation was performed for the search in paragraph 9.9, the screen would appear in this form:

History	
Search	Results
1 ORIGUSE \$ OQ	31

Press any key to continue.....

9.11 Viewing Site Records

Data records in the data base may be viewed on the screen by using Option 8. After you type **8**, one of the three selected records will be shown. By typing **F** for (F)orward, another selected record can be brought up until all records are viewed. If **A** is typed for (A)nother Site Record, you are prompted to enter the record number of the record to be viewed. The system will then try to locate the desired record. If the system cannot find the record number, a message to that affect will appear at the bottom of the screen.

If the system finds the record number, the screen clears again and the category layout appears. The layout consists of the record number at the top, which cannot be changed, and all category names. Each category name is followed by values. If all of the data cannot fit on one screen, you are asked to press any key and the system will display the rest of the data on successive screens.

9.12 Printing Data Records

This option allows you to print out the complete record for each of the records selected in a search. Using the example from paragraph 9.9, 31 complete records will be printed.

9.13 Stashing and Restoring

Depending on the hardware, some larger data bases may take considerable time to run the searches. If a lengthy search needs to be interrupted to free the computer for other work, you may save the results obtained up to the time of interruption by entering **S** for STASH and the chosen option. Later, the search may be continued by returning to the Search and Retrieve menu and entering **R** for RESTORE as the chosen option. The records selected previously will be returned for continuing the search.

9.14 Copying Data to a New Data Base

This option provides a method of creating a new, smaller data base with only selected records, without destroying the results of the search in the present data base. You may also choose the categories from the currently selected data base that you want included in the new data base. Once this option is executed, the NEW data base is automatically selected. This option is very useful when you use a large data base.

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ATTN: APEN-A

CECRL, ATTN: Library 03755

WES, ATTN: Library 39180

Norton AFB, CA 92409
ATTN: AFRCE-MX/DE

AFESC, Tyndall AFB, FL 32403

NAVFAC
ATTN: Engineering Command (9)
ATTN: Division Offices (11)
ATTN: Naval Public Works Center (9)
ATTN: Naval Civil Engr Lab. (2)
ATTN: Naval Constr Battalion Ctr

443 ABG/DE
Altus AFB, OK 73923-5436

43 CSG/DEEV
Anderson AFB APO 96334-5000

HQAFSC/DEV
Andrews AFB, MD 20334-5000

1776 ABW/DEEV
Andrews AFB, MD 20331-5000

AEDC/DEV
Arnold AFB, TN 37389

56 CSS/DEN
Aron Park AFB, FL 33225-5000

Environmental Office
Barksdale AFB, LA 71110-5000

9 CSG/DEEV
Beale AFB, CA 95903-5000

67 CSG/DEEV
Bergstrom AFB, TX 78743

343 CSG/DEEV
Bielson AFB, AK 99702

97 CSG/DEEV
Blytheville AFB, AR 72317-5000

6570 ABG/DE
Brooks AFB, TX 78235-5000

27 CSG/DEEV
Cannon AFB, NM 88103

7 CSG/DEEV
Carswell AFB, TX 76127-5000

93 BMW/CVE
Castle AFB, CA 95342-5000

437 ABG/DE
Charleston AFB, SC 29404-5045

3345 ABG/DE
Chanute AFB, IL 61868-5046

14 ABG/DE
Columbus AFB, MS 39701-5000

1010 CES/DEEV
Cheyenne Mountain AFS, CO 80912-5605

836 CSG/DEEV
Davis-Monthan AFB, AZ 85707-5000

94 CSG/DEEV
Dobbins AFB, GA 30069-5000

436 ABG/DE
Dover AFB, DE 19902-5516

96 CSG/DEEV
Dyess AFB, TX 76127-5000

AFFTC/DEV
Edwards AFB, CA 93523

44 CSG/DEEV
Ellsworth AFB, SD 57706-5000

HQ AAC/DEPV
Elmendorf AFB, AK 99506-5000

21 CSG/DEEV
Elmendorf AFB, AK 99506-5000

11 TCG/LGD
Elmendorf AFB, AK 99506

92 CSG/DEEV
Fairchild AFB, WA 99011-5000

931 CSG/DEV
George AFB, CA 92394-5000

3480 CES/DE
Goodfellow AFB, TX 76908-5000

321 CSG/DEEV
Grand Forks AFB, WA 58205-5000

418 CSG/DEEV
Griffiss AFB, NY 13441-5000

305 CSG/DEEV
Grissim AFB, IN 46971-5000

3245 ABG/DEEV
Hanscom AFB, MA 01731-5000

ESD/DEP
Hanscom AFB, MA 01731

2849 ABG/DEVW
Hill AFB, UT 84056

31 CSG/DEEV
Homestead AFB, FL 33039-5000

834 CSG/DE
Hurlburt Field, FL 32544-5000

3380 CES/DE
Keesler AFB, MS 39534-5000

SA ALC/EM
Kelly AFB, TX 78241

1606 ABW/DEEV
Kirkland AFB, NM 87117-5000

3700 ABG/DE
Lackland AFB, TX 78236-5000

HQ SAC/DEPV
Langley AFB, VA 23865-5001

47 ABG/DE
Laughlin AFB, TX 78843-5000

314 CSG/DE
Little Rock AFB, AR 72099-5000

42 CSG/DEEV
Loring AFB, ME 04751-5000

5D/DEV
Los Angeles AFB, CA 90009

3415 ABG/DE
Lowy AFB, CO 80230-5000

Environmental Office
Luke AFB, CA 85309-5000

56 CSG/DEEV
MacDill AFB, FL 33608

341 CSG/DEEV
Malstrom AFB, MT 59402-5000

22 CSG/DEEV
March AFB, CA 82518-5000

323 CES/DEEV
Mather AFB, CA 95655-5000

HQ AU/DEEV
Maxwell AFB, AL 36112-5001

62 ABG/DEEV
McChord AFB, WA 98438-5436

SM ALC/EM
McClellan AFB, CA 95652-5990

384 CSG/DEEV
McConnell AFB, KS 67221-5000

438 ABG/DE
McGuire AFB, NJ 08641

91 CSG/DEEV
Minot AFB, ND 58705-5000

347 CSG/DEEV
Moody AFB, GA 31699-5000

368 CSG/DEEV
Mt. Home AFB, ID 83648-5000

354 CSG/DEEV
Myrtle Beach AFB, SC 29579-5000

554 DESS/DESEP
Nellis AFB, NV 89191-5000

2803 ABG/DE
Newark AFB, OH 40357

63 ABG/DEEV
Norton AFB, CA 92409-5965

HQ SAC/DEV
Offutt AFB, NE 68113-5001

55 CSG/DEEV
Offutt AFB, NE 68113-5000

509 CSG/DEEV
Pease AFB, NH 03803-5000

AFSPACECOM/DEPD
Peterson AFB, CO 80914-5001

3SSW/XREE
Peterson AFB, CO 80914-5000

1003 CES/DEEV
Peterson AFB, CO 80914-5000

HQ ATC/DEE
Randolph AFB, TX 78150-5001

12 ABG/DE
Randolph AFB, TX 78150-5001

64 ABG/DE
Reese AFB, TX 79489

Environmental Office
Richards-Gebaur AFB, MO 64030

HQ AFRES/DEV
Robins AFB, MD 20334-5000

HQ MAC/DEEV
Scott AFB, IL 62225-5001

4 CSG/DEEV
Seymour Johnson AFB, NC 27531-5005

383 CSG/DEEV
Shaw AFB, SC 29152-5000

3750 ABG/DE
Sheppard AFB, TX 76311

325 CSG/DEEV
Tyndall AFB, FL 32403-5000

HQ USAFA/DE
USAF Academy, CO 80840-5841

71 ABG/DE and NW-DOM
Vance AFB, OK 73705-5000

1 STRAD/ET
Vandenberg AFB, CA 93437-5000

439 ABG/DE
Westover AFB, MA 01022-5000

351 CSG/DEEV
Whiteman AFB, MO 65305-5000

82 ABG/DEEV
Williams AFB, AZ 85240-5045

913 TAG/AFRES
Willowgrove AFB, PA 19090

HQ AFLC/DEV
Wright-Patterson AFB, OH 45433-5001

2750 ABW/EM and 2750 CES/DE
Wright-Patterson AFB, OH 45433-5000

913 TAG/AFRES
ASD/DES
Wright-Patterson AFB, OH 45433

ASD/PMD
Wright-Patterson AFB, OH 45433

AFIT/DEM
Wright-Patterson AFB, OH 45433

Environmental Office
Youngstown Municipal AFB, OH

379 CSG/DEEV
Wurtsmith AFB, MI 48753-5000

Chief of Engineers
ATTN: DAEN-ZCU

HQUSAF 20314
ATTN: LEEVO

Defense Technical Info. Center 22314
ATTN: DDA (2)

Natl Guard Bureau Instl. Div 20310

US Army Env. Hygiene Agency
ATTN: HSHB-E 21010

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05/89